



California Cooperative
Snow Surveys
Bulletin 120-4-99

State of California
The Resources Agency

Department of
Water Resources

Water Conditions in California

Report 4 May 1, 1999



Gray Davis
Governor
State of California

Mary D. Nichols
Secretary for Resources
The Resources Agency

Thomas M. Hannigan
Director
Department of Water Resources

STATE OF CALIFORNIA

Gray Davis, Governor

THE RESOURCES AGENCY

Mary D. Nichols, Secretary for Resources

Department of Water Resources

Thomas M. Hannigan
Director

Raymond D. Hart
Deputy Director

Vacant
Chief Deputy Director

Stephen L. Kashiwada
Deputy Director

L. Lucinda Chipponeri
Assistant Director for Legislation

Susan N. Weber
Chief Counsel

Division of Flood Management

George T. Qualley Chief
Maurice Roos Chief Hydrologist
Gary Hester Chief Forecaster

Prepared by

Frank Gehrke Chief, Snow Surveys
J. Pierre Stephens Senior Engineer, W.R.
Robert R. Newton Associate Engineer, W.R.
David M. Hart Water Resources Engineering Associate
Shawn T. Perkins Water Resources Technician II

COOPERATING AGENCIES

Public Agencies

- Buena Vista Water Storage District
- East Bay Municipal Utility District
- Friant Water Users Association
- Kaweah Delta Water Conservation District
- Kern Delta Water District
- Kings River Conservation District
- Lower Tule River Irrigation District
- Merced Irrigation District
- Modesto Irrigation District
- Nevada Irrigation District
- North Kern Water Storage District
- Northern California Power Agency
- Oakdale Irrigation District
- Omochumne-Hartnell Water District
- Oroville-Wyandotte Irrigation District
- Placer County Water Agency
- San Joaquin Exchange Contractors Water Association
- South San Joaquin Irrigation District
- Tri-Dam Project
- Tulare Lake Basin Water Storage District
- Turlock Irrigation District
- Yuba County Water Agency

Private Organizations

- J.G. Boswell Company
- Kaweah and St. Johns River Association
- Kings River Water Association
- Tule River Association
- State Water Contractors

Municipalities

- City of Bakersfield Water Department
- City of Los Angeles Department of Water and Power
- City and County of San Francisco Hetch Hetchy Water and Power

State Agencies

- University of California
 - Central Sierra Snow Laboratory
 - Scripps Institution of Oceanography
- California Department of Forestry & Fire Protection
- California Department of Water Resources

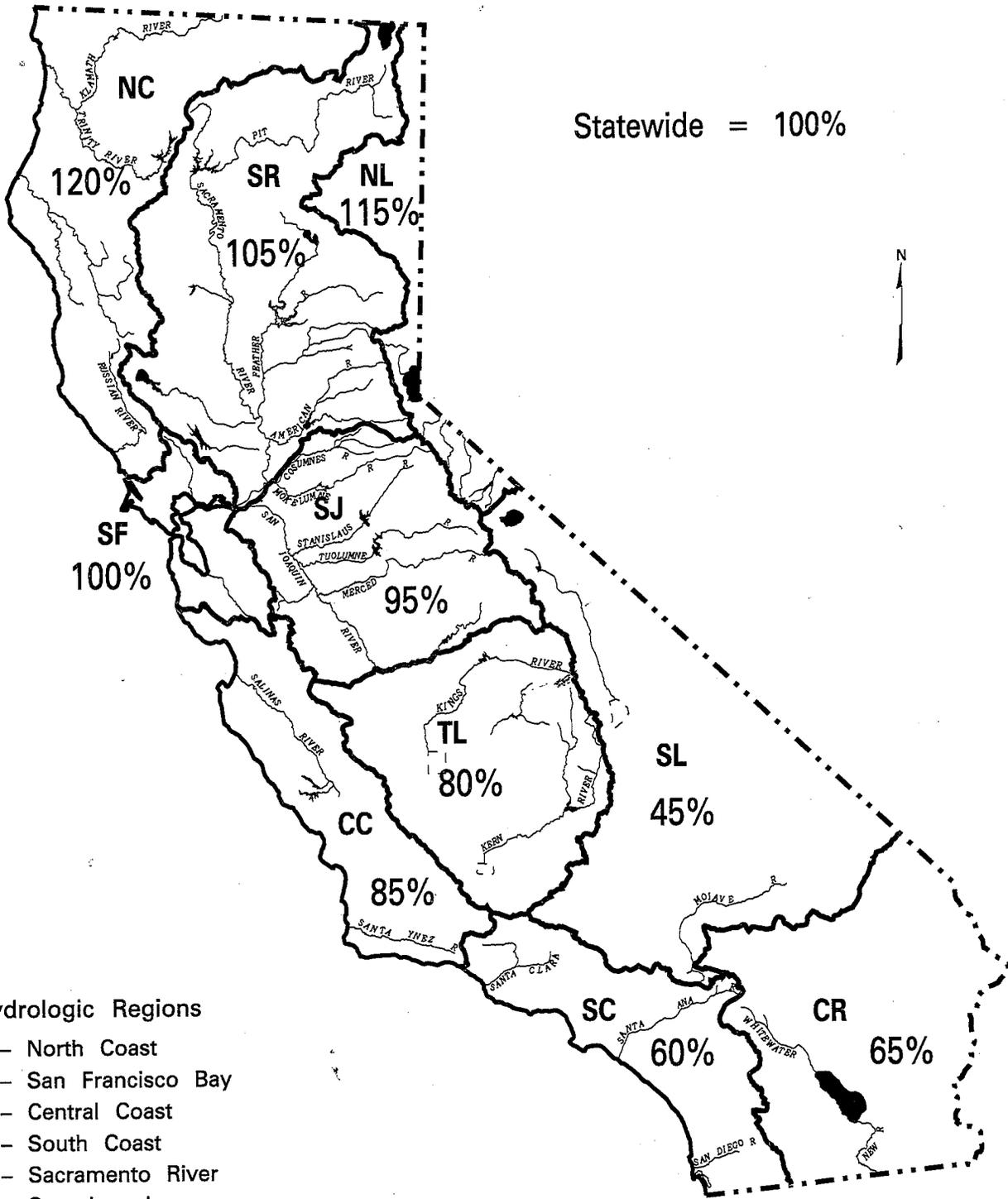
Federal Agencies

- U.S. Department of Agriculture
 - Forest Service(14 National Forests)
 - Natural Resource Conservation Service
- U.S. Department of Commerce
 - National Weather Service
- U.S. Department of Interior
 - Bureau of Reclamation
 - Geological Survey, Water Resources
 - National Park Service(3 National Parks)
- U.S. Department of Army
 - Corps of Engineers

Other Cooperative Programs

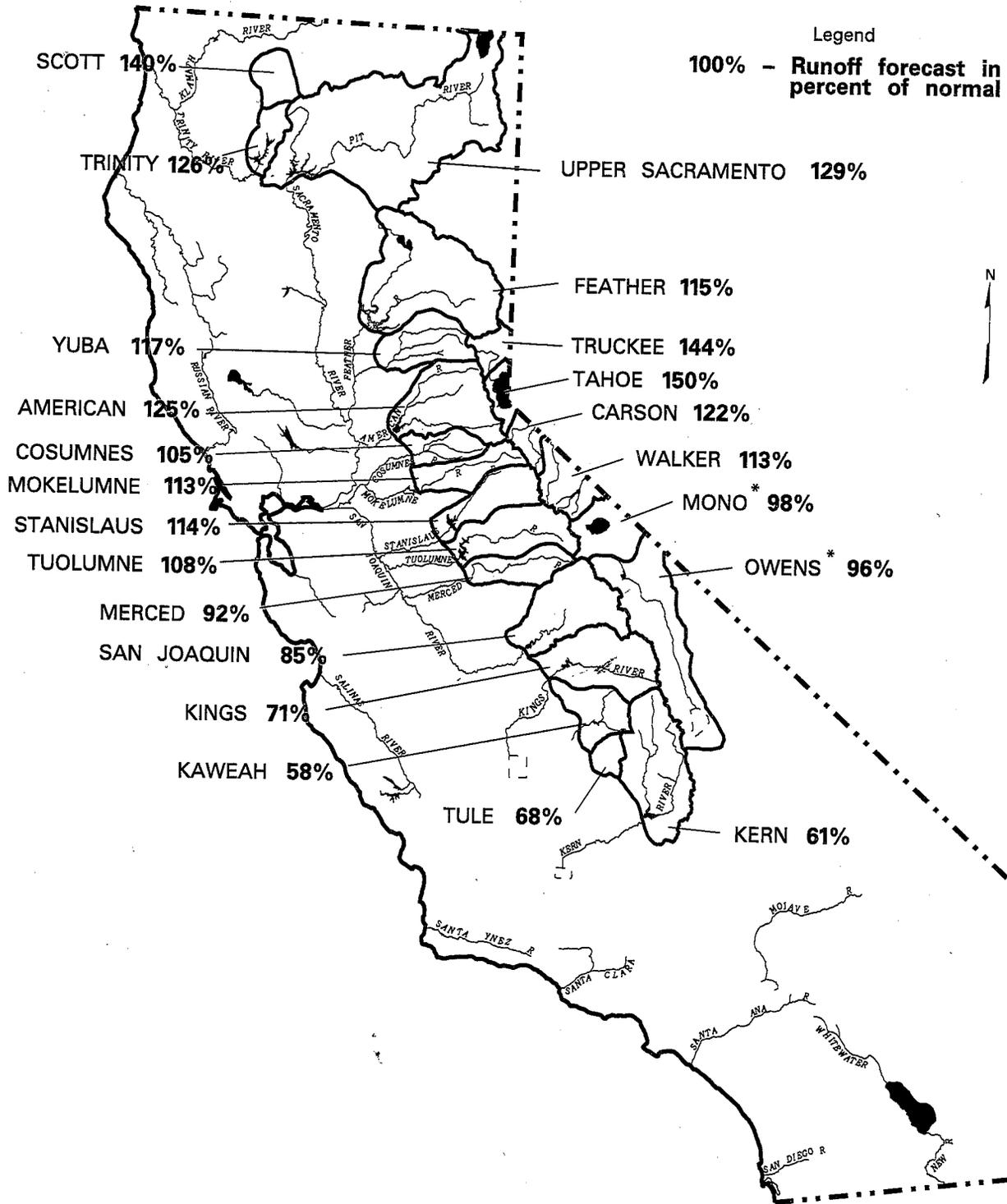
- Nevada Cooperative Snow Surveys
- Oregon Cooperative Snow Surveys

SEASONAL PRECIPITATION
 IN PERCENT OF AVERAGE TO DATE
 October 1, 1998 through April 30, 1999



- Hydrologic Regions**
- NC - North Coast
 - SF - San Francisco Bay
 - CC - Central Coast
 - SC - South Coast
 - SR - Sacramento River
 - SJ - San Joaquin
 - TL - Tulare Lake
 - NL - North Lahontan
 - SL - South Lahontan
 - CR - Colorado River-Desert

**FORECAST OF APRIL - JULY
UNIMPAIRED SNOWMELT RUNOFF**
May 1, 1999



* FORECAST BY DEPARTMENT OF WATER AND POWER, CITY OF LOS ANGELES

SUMMARY OF WATER CONDITIONS

May 1, 1999

Strong shower activity during the first part of April in the coastal and desert regions of California boosted statewide precipitation above average for the month. However, normally wetter areas of northern California had less than average precipitation during April. The storm systems were cool and the mountain snowpack continued to increase until near the middle of the month when a week of fair and warm weather began the melting process. Runoff forecasts have changed little from those of one month ago and the water supply outlook is good for most areas of the State.

Forecasts of April through July runoff are about 110 percent of average statewide and range from 130 percent in the North Coast region to 65 percent in the Tulare Lake region. Water year forecasts are also about 110 percent overall with the same steep north to south dropoff in the southern Sierra.

Snowpack water content is 120 percent of average statewide for this date, and approximately 95 percent of the average April 1 levels. Last year the May 1 snowpack was 190 percent of average. Snowmelt during April was less than normal.

Precipitation during April was about 125 percent of average statewide. High monthly percentages at many drier southern California locations more than offset below average amounts in the North Coast and Sacramento River regions. Seasonal precipitation since October 1 is nearly average overall with above average amounts in the northern parts of the State and much less in the south. Last year seasonal precipitation stood at 160 percent.

Runoff to date has been about 115 percent of average compared to 155 percent last year at this time. April runoff was approximately 105 percent of normal for the month. Estimated runoff of the 8 major rivers of the Sacramento and San Joaquin River regions was 3.2 million acre–feet.

Reservoir storage gains during April were about normal as flood control requirements at major Central Valley foothill reservoirs were eased. Storage percentages are essentially unchanged from last month at 115 percent of average for this date. This is the same as reported last year on May 1.

SUMMARY OF WATER CONDITIONS IN PERCENT OF AVERAGE

HYDROLOGIC REGION	PRECIPITATION OCTOBER 1 TO DATE	MAY 1 SNOW WATER CONTENT	MAY 1 RESERVOIR STORAGE	RUNOFF OCTOBER 1 TO DATE	APR–JULY RUNOFF FORECAST	WATER YEAR RUNOFF FORECAST
NORTH COAST	120	155	105	115	130	120
SAN FRANCISCO BAY	100	--	120	130	--	--
CENTRAL COAST	85	--	130	55	--	--
SOUTH COAST	60	--	120	35	--	--
SACRAMENTO RIVER	105	135	110	120	120	120
SAN JOAQUIN RIVER	95	125	120	105	100	105
TULARE LAKE	80	60	140	80	65	70
NORTH LAHONTAN	115	140	140	105	130	120
SOUTH LAHONTAN	45	90	105	105	95	100
COLORADO RIVER– DESERT	65	--	--	--	--	--
STATEWIDE	100	120	115	115	110	110

MAY 1, 1999 FORECASTS
APRIL-JULY UNIMPAIRED RUNOFF

HYDROLOGIC REGION and Watershed	Unimpaired Runoff in 1,000 Acre-Feet (1)					
	HISTORICAL			FORECAST		
	50 Yr Avg (2)	Max of Record	Min of Record	Apr-Jul Forecasts	Pct of Avg	80 % Probability Range (1)
SACRAMENTO RIVER						
Upper Sacramento River						
Sacramento River at Shasta Lake (3)	297	702	39	370	125%	
McCloud River at Shasta Lake	392	850	185	490	125%	
Pit River at Shasta Lake	1,056	2,203	480	1,370	130%	
Total Inflow to Shasta Lake	1,801	3,525	726	2,320	129%	2,100 - 2,620
Sacramento River above Bend Bridge, near Red Bluff	2,451	5,075	943	3,040	124%	2,740 - 3,500
Feather River						
Feather River at Lake Almanor near Prattville (3)	333	675	120	370	111%	
North Fork at Pulga (3)	1,028	2,416	243	1,150	112%	
Middle Fork near Clio (4)	86	518	4	100	116%	
South Fork at Ponderosa Dam (3)	110	267	13	125	114%	
Total Inflow to Oroville Reservoir	1,831	4,676	392	2,100	115%	1,880 - 2,420
Yuba River						
North Yuba below Goodyears Bar (3)	286	647	51	330	115%	
Inflow to Jackson Mdws and Bowman Reservoirs (3)	112	236	25	130	116%	
South Yuba at Langs Crossing (3)	233	481	57	280	120%	
Yuba River at Smartville	1,029	2,424	200	1,200	117%	1,090 - 1,360
American River						
North Fork at North Fork Dam (3)	262	716	43	330	126%	
Middle Fork near Auburn (3)	522	1,406	100	660	126%	
Silver Creek Below Camino Diversion Dam (3)	173	386	37	220	127%	
Total Inflow to Folsom Reservoir	1,261	3,074	229	1,580	125%	1,440 - 1,770
SAN JOAQUIN RIVER						
Cosumnes River at Michigan Bar	128	363	8	135	105%	100 - 170
Mokelumne River						
North Fork near West Point (5)	437	829	104	480	110%	
Total Inflow to Pardee Reservoir	459	1,065	102	520	113%	480 - 600
Stanislaus River						
Middle Fork below Beardsley Dam (3)	334	702	64	380	114%	
North Fork Inflow to McKays Point Dam (3)	224	503	34	260	116%	
Total Inflow to New Melones Reservoir	699	1,710	116	800	114%	730 - 910
Tuolumne River						
Cherry Creek & Eleanor Creek near Hetch Hetchy (3)	322	727	97	350	109%	
Tuolumne River near Hetch Hetchy (3)	606	1,392	153	650	107%	
Total Inflow to Don Pedro Reservoir	1,184	2,682	301	1,280	108%	1,180 - 1,450
Merced River						
Merced River at Pohono Bridge (3)	362	888	80	330	91%	
Total Inflow to Lake McClure	611	1,587	123	560	92%	510 - 640
San Joaquin River						
San Joaquin River at Mammoth Pool (6)	1,014	2,279	235	840	83%	
Big Creek below Huntington Lake (6)	95	264	11	75	79%	
South Fork near Florence Lake (6)	202	511	58	160	79%	
Total Inflow to Millerton Lake	1,212	3,355	262	1,030	85%	920 - 1,170
TULARE LAKE						
Kings River						
North Fork Kings River near Cliff Camp (3)	239	565	50	170	71%	
Total Inflow to Pine Flat Reservoir	1,183	3,114	273	840	71%	730 - 950
Kaweah River at Terminus Reservoir	276	814	61	160	58%	130 - 210
Tule River at Success Reservoir	59	259	2	40	68%	30 - 55
Kern River						
Kern River near Kernville (3)	373	1,203	83	230	62%	
Total Inflow to Isabella Reservoir	442	1,657	84	270	61%	230 - 330

(1) See inside back cover for definition

(2) All 50 year averages are based on years 1946-1995 unless otherwise not

(3) 50 year average based on years 1941-9

(4) 44 year average based on years 1936-79

(5) 36 year average based on years 1936-7

(6) 45 year average based on years 1936-8

MAY 1, 1999 FORECASTS
WATER YEAR UNIMPAIRED RUNOFF

HISTORICAL			Unimpaired Runoff in 1,000 Acre-Feet (1)								FORECAST			
50 Yr Avg (2)	Max of Record	Min of Record	Oct Thru Jan*	Feb *	Mar *	Apr *	May	Jun	Jul	Aug & Sep	Water Year Forecasts	Pct of Avg	80 % Probability Range (1)	
856	1,964	165												
1,184	2,353	577												
3,078	5,647	1,484												
5,896	10,796	2,479	2,315	1,170	1,090	785	760	480	295	495	7,390	125%	7,120 -	7,760
8,518	17,180	3,294	3,030	1,740	1,580	1,105	970	600	365	620	10,010	118%	9,650 -	10,590
780	1,269	366												
2,417	4,400	666												
219	637	24												
291	562	32												
4,526	9,492	994	1,450	945	820	670	810	440	180	205	5,520	122%	5,280 -	5,890
564	1,056	102												
181	292	30												
379	565	98												
2,337	4,926	369	720	520	350	305	510	310	75	55	2,845	122%	2,720 -	3,030
616	1,234	66												
1,070	2,575	144												
318	705	59												
2,674	6,381	349	620	705	440	425	640	410	105	35	3,380	126%	3,230 -	3,590
378	1,253	20	83	159	86	69	44	17	5	2	465	123%	425 -	505
626	1,009	197												
736	1,800	129	115	120	85	110	220	160	30	10	850	115%	800 -	930
471	929	88												
1,131	2,952	155	185	200	125	170	330	230	70	20	1,330	118%	1,250 -	1,460
461	1,147	123												
770	1,661	258												
1,857	4,430	383	270	255	170	260	480	420	120	35	2,010	108%	1,900 -	2,200
461	1,020	92												
952	2,859	150	110	110	70	125	240	155	40	20	870	91%	810 -	960
1,337	2,964	308												
112	298	14												
248	653	71												
1,753	4,642	362	195	110	100	185	390	335	120	65	1,500	86%	1,380 -	1,670
284	607	58												
1,647	4,294	383	155	75	75	145	345	260	90	45	1,190	72%	1,070 -	1,310
431	1,402	92	50	25	20	40	70	40	10	5	260	60%	230 -	320
135	615	16	36	16	11	15	15	8	2	2	105	78%	90 -	125
558	1,577	163												
694	2,309	175	130	35	35	55	90	85	40	30	500	72%	450 -	570

* Indicates observed runoff

**MAY 1, 1999 FORECASTS
APRIL-JULY UNIMPAIRED RUNOFF**

HYDROLOGIC REGION and Watershed	Unimpaired Runoff in 1,000 Acre-Feet (1)				
	HISTORICAL			FORECAST	
	50 Yr Avg (2)	Max of Record	Min of Record	Apr-Jul Forecasts	Pct of Avg
NORTH COAST					
Trinity River Total Inflow to Lewiston Lake	642	1,593	80	810	126%
Scott River Near Fort Jones	200	n/a	n/a	280	140%
Klamath River Total inflow to Upper Klamath Lake (3)	422	583	277	n/a	
<hr/>					
NORTH LAHONTAN					
Truckee River Lake Tahoe to Farad accretions	264	713	58	380	144%
Lake Tahoe Rise (assuming gates closed, in feet)	1.4	3.6	0.2	2.1	150%
Carson River West Fork at Woodfords	54	135	12	70	130%
East Fork near Gardnerville	183	407	43	220	120%
Walker River West Fork near Coleville	143	330	35	160	112%
East Fork near Bridgeport	61	209	7	70	115%
<hr/>					
SOUTH LAHONTAN					
Owens River Total tributary flow to Owens River (4)	226	579	96	218	96%

(1) See inside back cover for definition

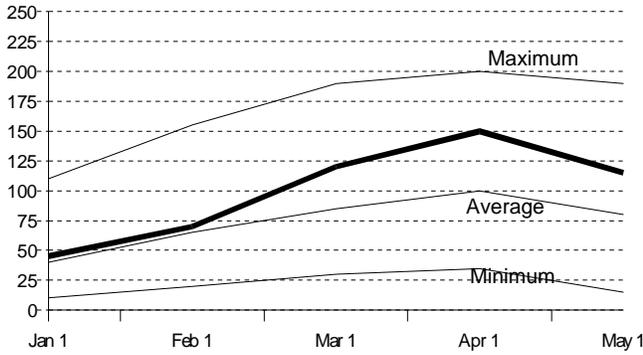
(2) All 50 year averages are based on years 1946-1995 unless otherwise not

(3) Forecast by U.S. Natural Resources Conservation Service, Portland Oregon, 30 year average based on years 1961-1990
April through July forecast

(4) Forecast by Department of Water and Power, City of Los Angeles

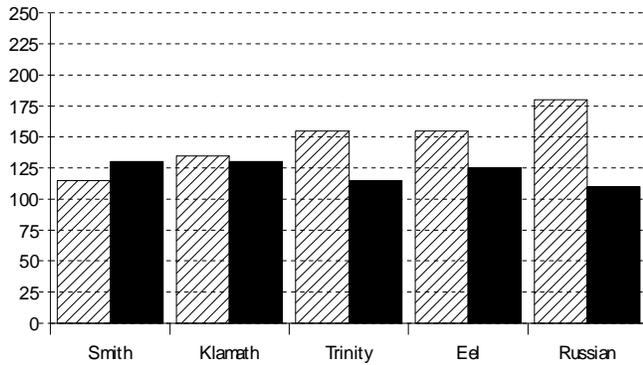
Snowpack Accumulation

Water Content in % of April 1 Average



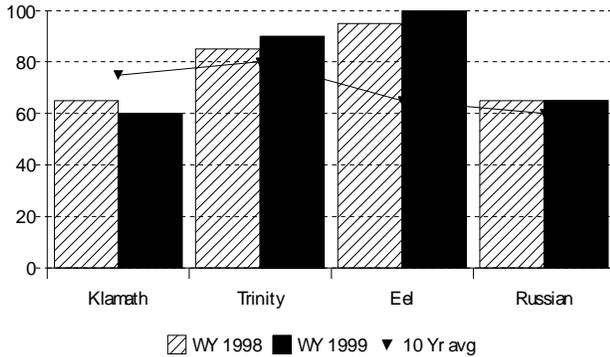
Precipitation

October 1 to date in % of Average



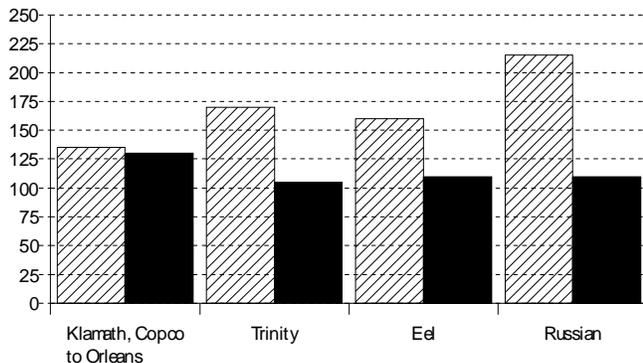
Reservoir Storage

Contents of major reservoirs in % of capacity



Runoff

October 1 to date in % of average



NORTH COAST REGION

SNOWPACK– First of the month measurements made at 10 snow courses indicate an area wide snow water equivalent of 37.0 inches. This is 115 percent of the seasonal April 1 average and 155% of the May 1 average. Last year at this time the pack was holding 62.1 inches of water.

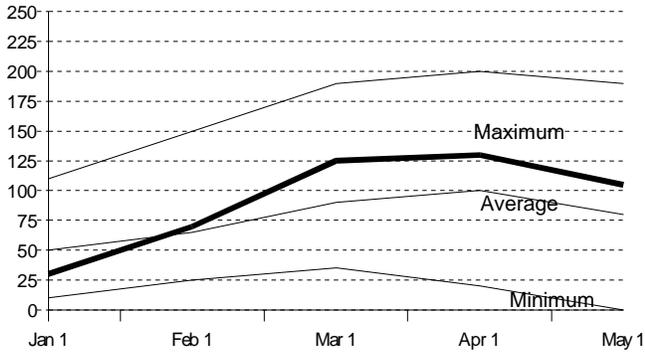
PRECIPITATION – Seasonal precipitation (October 1 through the end of last month) on this area was 120 percent of normal. Precipitation last month was about 70 percent of the monthly average. Seasonal precipitation at this time last year stood at 145 percent of normal.

RESERVOIR STORAGE– First of the month storage in 7 reservoirs was 2.7 million acre–feet which is 105 percent of average. About 85 percent of available capacity was being used. Storage in these reservoirs at this time last year was 105 percent of average.

RUNOFF –Seasonal runoff of streams draining the area totaled 12.8 million acre–feet which is 115 percent of the average for this period. Last year, runoff for the same period was 155 percent of average.

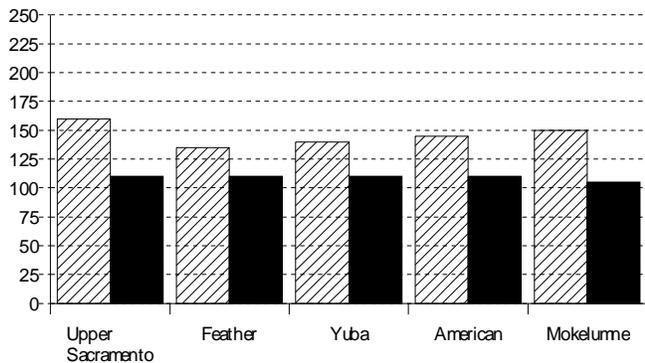
Snowpack Accumulation

Water Content in % of April 1 Average



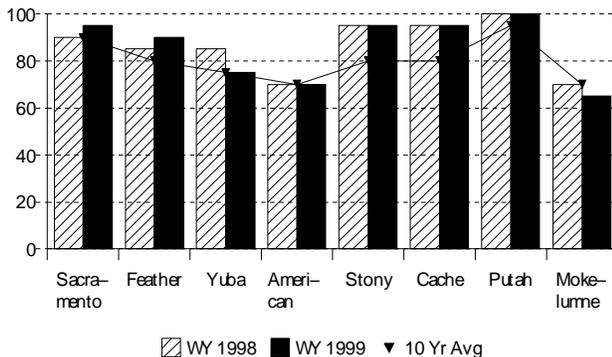
Precipitation

October 1 to date in % of Average



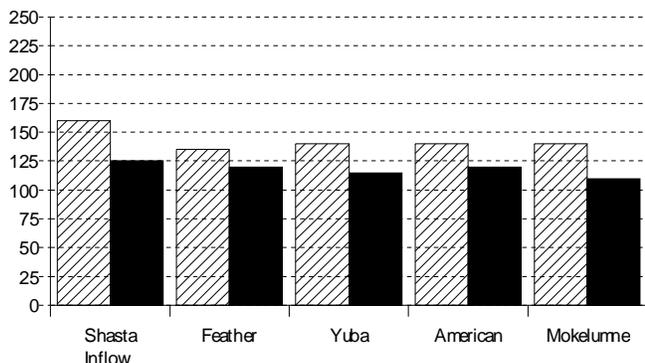
Reservoir Storage

Contents of major reservoirs in % of capacity



Runoff

October 1 to date in % of average



SACRAMENTO RIVER REGION

SNOWPACK– First of the month measurements made at 37 snow courses indicate an area wide snow water equivalent of 34.5 inches. This is 105 percent of the seasonal April 1 average and 135 percent of the May 1 average. Last year at this time the pack was holding 39.9 inches of water.

PRECIPITATION – Seasonal precipitation (October 1 through the end of last month) on this area was 105 percent of normal. Precipitation last month was about 80 percent of the monthly average. Seasonal precipitation at this time last year stood at 150 percent of normal.

RESERVOIR STORAGE– First of the month storage in 43 reservoirs was 14.2 million acre–feet which is 110 percent of average. About 90 percent of available capacity was being used. Storage in these reservoirs at this time last year was 105 percent of average.

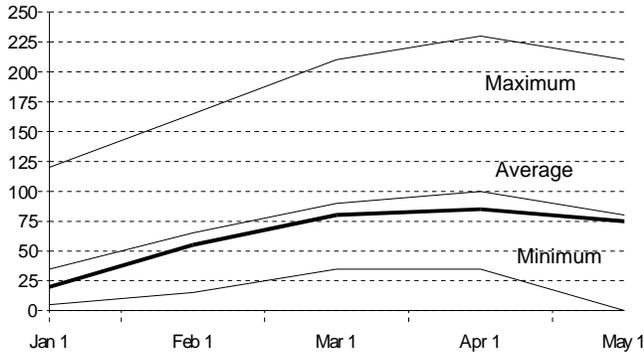
RUNOFF – Seasonal runoff of streams draining the area totaled 15.4 million acre–feet which is 120 percent of average for this period. Last year, runoff for the same period was 160 percent of average.

The **Sacramento Region 40–30–30 Water Supply Index** is forecast to be 10.0 assuming median meteorological conditions for the remainder of the year. This classifies the year as "wet" in the Sacramento Valley according to the State Water Resources Control Board.

SAN JOAQUIN RIVER AND TULARE LAKE REGIONS

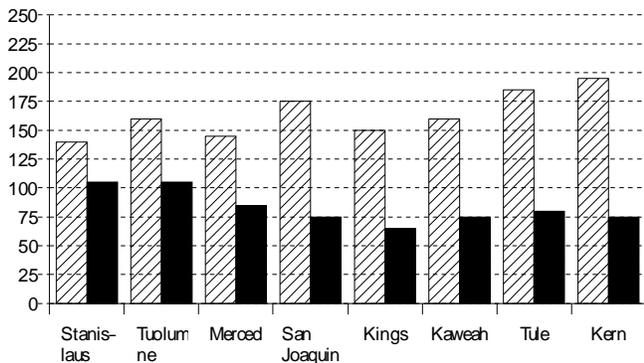
Snowpack Accumulation

Water Content in % of April 1 Average



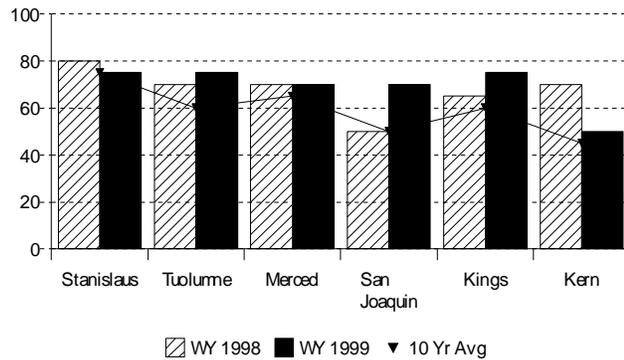
Precipitation

October 1 to date in % of Average



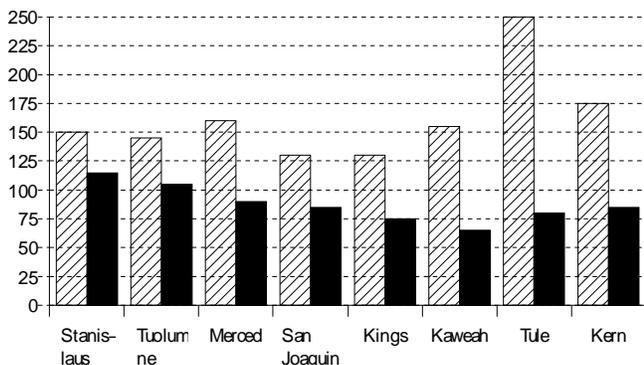
Reservoir Storage

Contents of major reservoirs in % of capacity



Runoff

October 1 to date in % of average



SNOWPACK– First of the month measurements made at 50 **San Joaquin Region** snow courses indicate an area wide snow water equivalent of 33.8 inches. This is 100 percent of the seasonal (April 1) average and 125 percent of the May 1 average. Last year at this time the pack was holding 50.4 inches of water.

At the same time 31 **Tulare Lake Region** snow courses indicated a basin-wide snow water equivalent of 12.4 inches which is 45 percent of the average for April 1 and 60 percent of May 1. Last year at this time the basin was holding 40.9 inches of water.

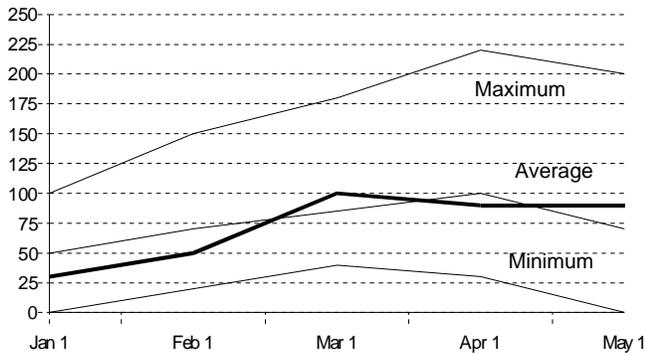
PRECIPITATION – Seasonal precipitation (October 1 through the end of last month) on the **San Joaquin Region** was 95 percent of normal. Precipitation last month was about 100 percent of the monthly average. Seasonal precipitation at this time last year stood at 165 percent of normal. Seasonal precipitation on the **Tulare Lake Region** was 80 percent of normal. Precipitation last month was about 125 percent of the monthly average. Seasonal precipitation at this time last year stood at 175 percent of normal.

RESERVOIR STORAGE– First of the month storage in 33 **San Joaquin Region** reservoirs was 8.7 million acre-feet which is 120 percent of average. About 75 percent of available capacity was being used. Storage in these reservoirs at this time last year was 115 percent of average. First of the month storage in 6 **Tulare Lake Region** reservoirs was 1.3 million acre-feet which is 140 percent of average and about 65 percent of available capacity. Storage in these reservoirs at this time last year was 145 percent of average.

RUNOFF– Seasonal runoff of streams draining the **San Joaquin Region** totaled 3.5 million acre-feet which is 105 percent of average for this period. Last year, runoff for the same period was 150 percent of average. Seasonal runoff of streams draining the **Tulare Lake Basin** totaled 934 thousand acre-feet which is 80 percent of average for this period. Last year runoff for this same period was 155 percent of average. The **San Joaquin Region 60–20–20 Water Supply Index** is forecast to be 3.5 assuming median meteorological conditions. This classifies the year as "above normal" in the San Joaquin River Region according to the State Water Resources Control Board.

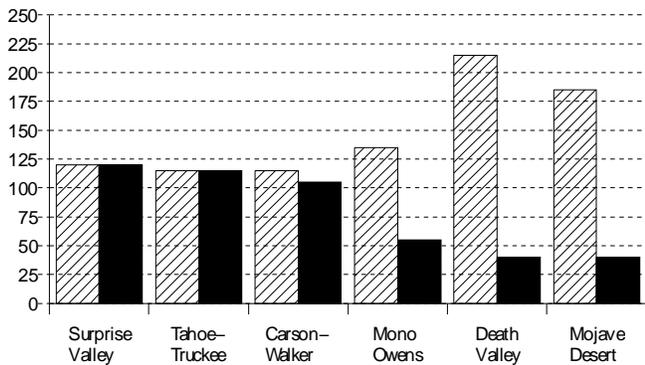
Snowpack Accumulation

Water Content in % of April 1 Average



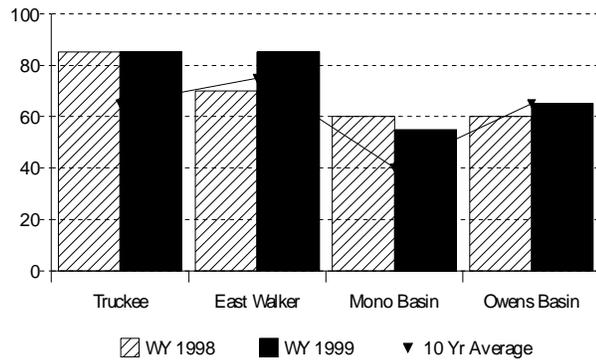
Precipitation

October 1 to date in % of Average



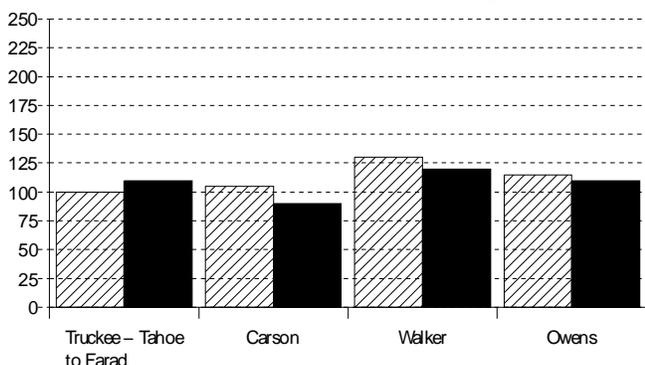
Reservoir Storage

Contents of major reservoirs in % of capacity



Runoff

October 1 to date in % of average



NORTH AND SOUTH LAHONTAN REGIONS

SNOWPACK– First of the month measurements made at 24 **North Lahontan Region** snow courses indicate an area wide snow water equivalent of 28.0 inches. This is 110 percent of the seasonal (April 1) average and 140 percent of the May 1 average. Last year at this time the pack was holding 28.9 inches of water. At the same time 9 **South Lahontan** snow courses indicated a basin-wide snow water equivalent of 14.5 inches which is 70 percent of the seasonal (April 1) average and 90 percent of the May 1 average. Last year at this time the basin was holding 30.4 inches of water.

PRECIPITATION – Seasonal precipitation (October 1 through the end of last month) on the **North Lahontan Region** was 115 percent of normal. Precipitation last month was about 145 percent of the monthly average. Seasonal precipitation at this time last year stood at 115 percent of normal. Seasonal precipitation on the **South Lahontan** was 45 percent of normal. Precipitation last month was about 300 percent of the monthly average. Seasonal precipitation at this time last year stood at 170 percent of normal.

RESERVOIR STORAGE– First of the month storage in 5 **North Lahontan** reservoirs was 900 thousand acre-feet which is 140 percent of average. About 85 percent of available capacity was being used. Storage in these reservoirs at this time last year was 140 percent of average. Lake Tahoe was 5.0 feet above its natural rim on May 1. First of the month storage in 8 **South Lahontan** reservoirs was 280 thousand acre-feet which is 105 percent of average and about 70 percent of available capacity. Storage in these reservoirs at this time last year was 95 percent of average.

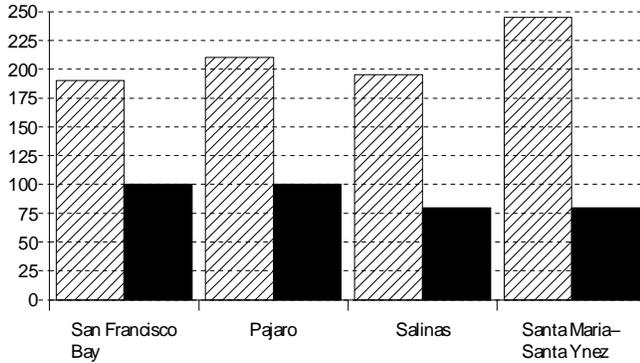
RUNOFF– Seasonal runoff of streams draining the **North Lahontan Region** totaled 444 thousand acre-feet which is 105 percent of average for this period. Last year, runoff for the same period was 110 percent of average.

Seasonal runoff of the Owens River in the **South Lahontan** totaled 83 thousand acre-feet which is 105 percent of average for this period. Last year runoff for this same period was 115 percent of average.

SAN FRANCISCO BAY AND CENTRAL COAST REGIONS

Precipitation

October 1 to date in % of Average

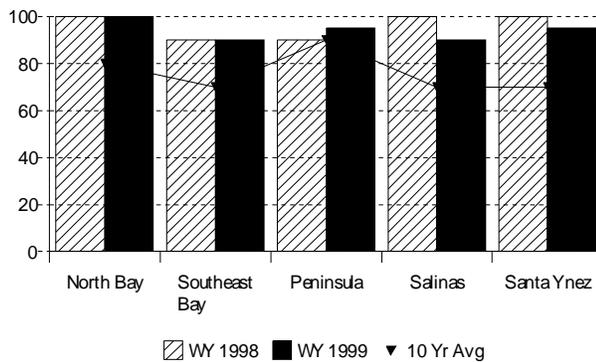


PRECIPITATION – Seasonal precipitation (October 1 through the end of last month) on the **San Francisco Bay Region** was 100 percent of normal. Precipitation last month was about 140 percent of the monthly average. Seasonal precipitation at this time last year stood at 180 percent of normal.

Seasonal precipitation on the **Central Coast Region** was 85 percent of normal. Precipitation last month was about 130 percent of the monthly average. Seasonal precipitation at this time last year stood at 220 percent of normal.

Reservoir Storage

Contents of major reservoirs in % of capacity



RESERVOIR STORAGE– First of the month storage in 18 **San Francisco Bay Region** reservoirs was 633 thousand acre–feet which is 120 percent of average. About 90 percent of available capacity was being used. Storage in these reservoirs at this time last year was 125 percent of average.

First of the month storage in 6 **Central Coast Region** reservoirs was 890 thousand acre–feet which is 130 percent of average and about 90 percent of available capacity. Storage in these reservoirs at this time last year was 135 percent of average.

Runoff

October 1 to date in % of average



RUNOFF– Seasonal runoff of the Napa River in the **San Francisco Bay Region** totaled 86 thousand acre–feet which is 130 percent of average for this period. Last year, runoff for the same period was 200 percent of average.

Seasonal runoff of streams draining the **Central Coast Region** totaled 170 thousand acre–feet which is 55 percent of average for this period. Last year runoff for this same period was 230 percent of average.

SOUTH COAST AND COLORADO RIVER REGIONS

PRECIPITATION – October through April (seasonal) precipitation on the **South Coast Region** was 60 percent of normal. March precipitation was 175 percent of the monthly average. Seasonal precipitation at this time last year was 195 percent of normal. Seasonal precipitation on the **Colorado River–Desert Region** was 65 percent of normal. Precipitation in April was 630 percent of average. Seasonal precipitation at this time last year stood at 170 percent of average.

RESERVOIR STORAGE – May 1 storage in 29 major **South Coast Region** reservoirs was 1.6 million acre–feet or 120 percent of average. About 80 percent of available capacity was being used. Storage in these reservoirs at this time last year was 135 percent of average. On May 1 combined storage in Lakes Powell, Mead, Mohave and Havasu was about 47 million acre–feet or about 130 percent of average. About 90 percent of available capacity was in use. Last year at this time, these reservoirs were storing 130 percent of average.

RUNOFF – Seasonal runoff from selected **South Coast Region** streams totaled 20 thousand acre–feet which is 35 percent of average. Seasonal runoff from these streams last year was 170 percent of average.

COLORADO RIVER

The April –July inflow to Lake Powell is forecast to be 7.0 million acre–feet, which is 90 percent of average. The May 1 snowpack in the Upper Colorado River basin was 110 percent of average, highest in the Green at 138 percent and lowest in the Animas at 93 percent.

STATE WATER PROJECT

The State Water Project has approved delivery of 100% of the 3.2 million acre–feet of contractor's requests for 1999. This approval considered several factors including the existing storage in SWP reservoirs, the current forecast of runoff including a conservative projection of hydrology and water supply expected to develop during the remainder of the 1999–00 water year, SWP operational constraints, and 1999 contractor demands.

It is anticipated that Oroville Reservoir will fill this year due to the above normal runoff conditions.

MAJOR WATER DISTRIBUTION PROJECTS

RESERVOIR STORAGE

(Averages based on period record)

Reservoir	Capacity 1,000 AF	Average Storage 1,000 AF	1998 1,000 AF	Storage at End of APRIL		
				1999 1,000 AF	Percent Average	Percent Capacity
<i>STATE WATER PROJECT</i>						
Lake Oroville	3,538	2,961	3,026	3,247	110%	92%
San Luis Reservoir (SWP)	1,062	995	1,062	1,012	102%	95%
Lake Del Valle	77	39	39	40	102%	51%
Lake Silverwood	73	67	68	72	107%	99%
Pyramid Lake	171	164	156	161	99%	94%
Castaic Lake	324	282	319	298	106%	92%
Perris Lake	132	115	122	125	108%	95%
<i>CENTRAL VALLEY PROJECT</i>						
Clair Engle Lake	2,448	2,080	2,113	2,208	106%	90%
Lake Shasta	4,552	4,096	4,061	4,256	104%	94%
Whiskeytown Lake	241	231	234	235	102%	97%
Folsom Lake	977	739	760	756	102%	77%
New Melones Reservoir	2,420	1,549	2,052	1,992	129%	82%
Millerton Lake	520	316	368	513	162%	99%
San Luis Reservoir (CVP)	971	872	938	902	103%	93%
<i>COLORADO RIVER PROJECT</i>						
Lake Mead	26,159	19,574	24,813	24,216	124%	93%
Lake Powell	25,002	15,098	20,745	20,893	138%	84%
Lake Mohave	1,810	1,634	1,728	1,670	102%	92%
Lake Havasu	619	579	581	583	101%	94%
<i>EAST BAY MUNICIPAL UTILITY DISTRICT</i>						
Pardee Reservoir	198	180	200	167	93%	84%
Camanche Reservoir	417	268	256	284	106%	68%
East Bay (4 reservoirs)	151	132	145	151	115%	100%
<i>CITY AND COUNTY OF SAN FRANCISCO</i>						
Hetch-Hetchy Reservoir	360	151	138	190	126%	53%
Cherry Lake	268	135	129	199	148%	74%
Lake Eleanor	26	13	26	21	161%	82%
South Bay/Peninsula (4 res.)	225	176	217	220	125%	98%
<i>CITY OF LOS ANGELES (D.W.P.)</i>						
Lake Crowley	183	127	118	125	99%	68%
Grant Lake	48	25	42	39	155%	81%
Other Aqueduct Storage (6 res.)	95	75	63	69	92%	73%

TELEMETERED SNOW WATER EQUIVALENTS

MAY 1, 1999

(Averages Based on Period Record)

BASIN NAME STATION NAME	ELEV	Inches of Water Equivalent				
		April 1 AVERAGE	MAY 1	Percent of Average	24 HRS Previous	1 Week Previous
TRINITY RIVER						
Peterson Flat	7150'	29.2	35.9	123%	36.5	37.8
Red Rock Mountain	6700'	39.6	33.3	84%	33.3	37.9
Bonanza King	6450'	40.5	42.8	106%	43.5	46.0
Shimmy Lake	6200'	40.3	69.4	172%	70.0	71.8
Middle Boulder 3	6200'	28.3	—	—	—	—
Highland Lakes	6030'	29.9	44.2	148%	46.4	50.3
Scott Mountain	5900'	16.0	25.4	159%	25.9	28.9
Mumbo Basin	5700'	22.4	30.6	137%	31.7	35.6
Big Flat	5100'	15.8	18.4	117%	19.4	22.9
SACRAMENTO RIVER						
Cedar Pass	7100'	18.1	19.7	109%	20.0	22.2
Blacks Mountain	7100'	12.7	10.6	83%	11.3	14.0
Sand Flat	6750'	42.4	42.7	101%	43.7	47.5
Medicine Lake	6700'	32.6	41.6	128%	42.0	45.4
Adin Mountain	6350'	13.6	10.1	74%	11.4	15.0
Snow Mountain	5950'	27.0	44.4	164%	45.2	50.9
Slate Creek	5600'	29.0	32.2	111%	34.2	39.4
Stouts Meadow	5400'	36.0	40.0	111%	42.3	49.0
FEATHER RIVER						
Kettle Rock	7300'	25.5	35.5	139%	36.2	39.0
Grizzly Ridge	6900'	29.7	34.9	118%	35.2	38.4
Pilot Peak (DWR)	6800'	52.6	54.1	103%	55.2	61.3
Gold Lake	6750'	36.5	58.1	159%	58.2	59.8
Humbug	6500'	28.0	46.2	165%	46.2	50.8
Rattlesnake	6100'	14.0	9.5	68%	10.2	14.8
Bucks Lake	5750'	44.7	43.9	98%	44.8	49.7
Four Trees	5150'	20.0	3.8	19%	6.2	14.2
EEL RIVER						
Noel Spring	5100'	—	0.0	—	0.0	0.0
Plaskett Meadows	6000'	—	—	—	—	—
YUBA & AMERICAN RIVERS						
Lake Lois	8800'	39.5	—	—	—	—
Schneiders	8750'	34.5	—	—	—	—
Caples Lake (DWR)	7800'	30.9	42.0	136%	42.0	42.4
Alpha (Smud)	7600'	35.9	45.3	126%	45.8	50.2
Beta	7600'	35.9	47.8	133%	48.4	51.1
Meadow Lake	7200'	55.5	77.7	140%	78.4	79.7
Silver Lake (DWR)	7100'	22.7	38.5	170%	38.5	38.5
Central Sierra Snow Lab	6950'	33.6	40.7	121%	41.2	45.1
Huysink	6600'	42.6	42.6	100%	43.1	46.6
Van Vleck	6700'	35.9	44.3	123%	45.4	51.7
Robbs Saddle	5900'	21.4	18.7	87%	19.9	24.0
Greek Store	5600'	21.0	18.1	86%	19.2	23.2
Blue Canyon	5280'	9.0	0.0	0%	0.0	0.0
Robbs Powerhouse	5150'	5.2	0.0	0%	0.0	0.0
MOKELUMNE & STANISLAUS RIVERS						
Deadman Creek	9250'	37.2	32.4	87%	32.0	30.5
Highland Meadow	8800'	47.9	51.0	107%	50.8	50.2
Gianelli Meadow	8350'	55.5	53.0	95%	53.0	53.6
Lower Relief Valley	8100'	41.2	46.8	114%	47.5	49.5
Blue Lakes	8000'	33.1	38.4	116%	38.4	38.4
Mud Lake	7900'	44.9	62.4	139%	62.6	—
Stanislaus Meadow	7750'	47.5	53.6	113%	54.0	55.7
Bloods Creek	7200'	35.5	28.9	81%	29.9	32.6
Black Springs	6500'	32.0	30.8	96%	31.8	34.1
TUOLUMNE & MERCED RIVERS						
Dana Meadows	9800'	27.7	29.4	106%	29.4	28.1
Slide Canyon	9200'	41.1	52.3	127%	51.0	50.4
Snow Flat	8700'	44.1	—	—	—	—
Tuolumne Meadows	8600'	22.6	18.2	81%	18.2	19.4
Horse Meadow	8400'	48.6	52.3	108%	53.7	53.7
Ostrander Lake	8200'	34.8	35.6	102%	36.2	37.6
Paradise Meadow	7650'	41.3	42.9	104%	42.9	42.2
Gin Flat	7050'	34.2	20.6	60%	21.2	24.6
Lower Kibbie Ridge	6600'	27.4	18.2	66%	19.5	23.4

TELEMETERED SNOW WATER EQUIVALENTS

MAY 1, 1999

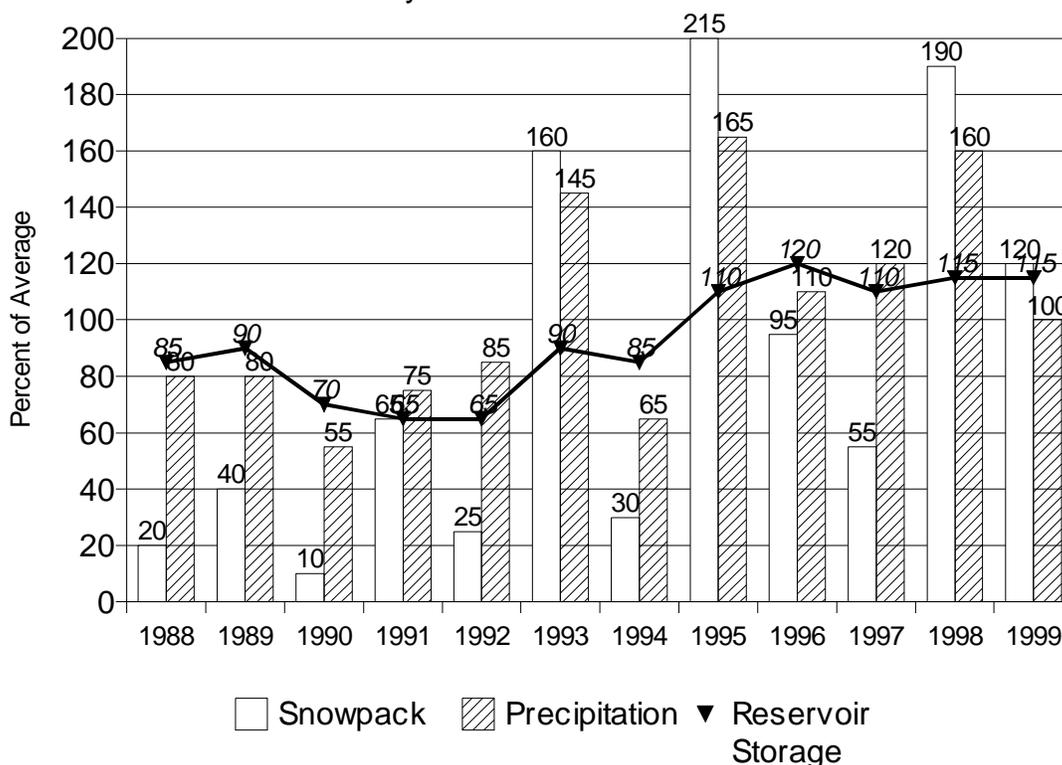
(Averages Based on Period Record)

BASIN NAME STATION NAME	ELEV	April 1 AVERAGE	MAY 1	Inches of Water Equivalent			
				Percent of Average	24 HRS Previous	1 Week Previous	
SAN JOAQUIN RIVER							
Volcanic Knob	10100'	30.1	26.8	89%	26.8	27.5	
Agnew Pass	9450'	32.3	34.9	108%	34.9	32.9	
Kaiser Point	9200'	37.8	21.0	56%	21.0	22.1	
Green Mountain	7900'	30.8	16.1	52%	17.0	20.4	
Tamarack Summit	7600'	30.5	13.1	43%	13.7	17.0	
Chilkoot Meadow	7150'	38.0	30.0	79%	30.2	33.5	
Huntington Lake (USBR)	7000'	20.1	12.5	62%	13.1	16.3	
Graveyard Meadow	6900'	18.8	8.8	47%	9.0	12.2	
Poison Ridge	6900'	28.9	13.6	47%	13.8	18.1	
KINGS RIVER							
Bishop Pass	11200'	34.0	23.2	68%	23.2	23.2	
Charlotte Lake	10400'	27.5	19.5	71%	19.1	18.0	
State Lakes	10400'	29.0	23.8	82%	23.6	24.2	
Mitchell Meadow	10375'	32.9	26.6	81%	26.3	26.4	
Blackcap Basin	10300'	34.3	24.2	71%	24.2	24.9	
Upper Burnt Corral	9700'	34.6	31.4	91%	31.4	32.0	
West Woodchuck Meadow	9100'	32.8	—	—	—	—	
Big Meadows (DWR)	7600'	25.9	—	—	—	—	
KAWEAH & TULE RIVERS							
Quaking Aspen	7200'	21.0	0.0	0%	0.0	3.6	
Giant Forest (Corps)	6400'	10.0	0.0	0%	0.0	0.0	
KERN RIVER							
Upper Tyndall Creek	11500'	27.7	17.0	61%	17.0	16.4	
Crabtree Meadow	10700'	19.8	7.0	35%	7.0	7.7	
Chagoopa Plateau	10300'	21.8	10.9	50%	10.9	12.2	
Pascoes	9150'	24.9	21.8	88%	21.8	23.7	
Tunnel Guard Station	8950'	15.6	0.0	0%	0.0	0.0	
Wet Meadows	8900'	30.3	0.0	0%	6.8	10.7	
Casa Vieja Meadows	8400'	20.9	5.9	28%	5.9	8.5	
Beach Meadows	7650'	11.0	0.0	0%	0.0	0.0	
SURPRISE VALLEY AREA							
Dismal Swamp	7050'	29.2	38.1	130%	38.1	39.5	
TRUCKEE RIVER							
Mount Rose Ski Area	8850'	38.5	52.1	135%	52.2	53.0	
Independence Lake (NRCS)	8450'	41.4	64.7	156%	64.6	63.6	
Big Meadows (NRCS)	8700'	25.7	27.4	107%	27.5	27.6	
Independence Camp	7000'	21.8	22.0	101%	23.2	26.1	
Independence Creek	6500'	12.7	11.5	91%	12.5	15.1	
LAKE TAHOE BASIN							
Heavenly Valley	8800'	28.1	39.9	142%	39.9	40.2	
Hagans Meadow	8000'	16.5	23.0	139%	23.5	25.4	
Marlette Lake	8000'	21.1	30.4	144%	31.0	32.7	
Echo Peak 5	7800'	39.5	52.6	133%	52.6	54.8	
Rubicon Peak 2	7500'	29.1	46.9	161%	46.9	47.4	
Ward Creek 3	6750'	39.4	42.7	108%	44.0	46.8	
Fallen Leaf Lake	6300'	7.0	0.0	0%	0.0	0.0	
CARSON RIVER							
Ebbetts Pass	8700'	38.8	49.2	127%	49.3	48.4	
Poison Flat	7900'	16.2	16.7	103%	16.7	19.1	
WALKER RIVER							
Virginia Lakes	9200'	20.3	16.6	82%	16.9	17.7	
Lobdell Lake	9200'	17.3	16.1	93%	16.4	16.2	
Sonora Pass Bridge	8750'	26.0	31.7	122%	31.7	31.7	
Leavitt Meadows	7200'	8.0	1.8	22%	3.4	6.6	
OWENS RIVER/MONO LAKE							
Gem Pass	10750'	31.7	29.4	93%	29.4	30.7	
Sawmill	10300'	19.4	14.4	74%	14.4	14.4	
Cottonwood Lakes	10200'	11.6	9.0	78%	9.0	9.4	
Big Pine Creek	9800'	17.9	9.8	55%	9.8	10.4	
South Lake	9600'	16.0	10.6	66%	10.2	10.2	
Mammoth Pass (USBR)	9500'	42.4	38.5	91%	38.2	38.2	
Rock Creek Lakes	10000'	14.0	8.3	59%	8.3	9.6	

NORMAL SNOWPACK ACCUMULATION EXPRESSED AS A PERCENT OF APRIL 1ST AVERAGE

AREA	JANUARY	FEBRUARY	MARCH	APRIL	MAY
Central Valley North	45%	70%	90%	100%	75%
Central Valley South	45%	65%	85%	100%	80%
North Coast	40%	60%	85%	100%	80%

May 1 Statewide Conditions



SNOWLINES

Next year's annual meeting of the Western Snow Conference will be hosted by the North Pacific Region. It will be held April 17–20 at Port Angeles, WA. For further information regarding the Western Snow Conference contact Frank Gehrke at 916–574–2635 or gridley@water.ca.gov. Information is available on the web at <http://snobear.colorado.edu/WSC/WSC.html>.

Depicted on this month's cover is Wapuma Falls cascading into Hetch Hetchy reservoir near the peak of last year's snowmelt runoff in mid June. Photo by Pierre Stephens.

The Sandia Snow Detectors were the hit of the Western Snow Conference meeting just held. Five detectors were ordered for delivery to Kathmandu, Nepal. Seven existing sensor sites in California will be fitted with the new detectors during the upcoming field season, five by the State and two by the Corps of Engineers. Further improvements are under design to reduce the size and power consumption.

The 1999 annual meeting of the California Cooperative Snow Surveys program will be held at the UCLA conference center in Lake Arrowhead November 3–5.

SNOWPACK - Snow data is a major index of spring and summer runoff from Sierra Nevada watersheds. April 1 data historically reflects the magnitude of the snowpack at or near the maximum seasonal accumulation. Averages are based on April 1 data for the period 1946-1995 (50 years, except for data sites established after 1941).

PRECIPITATION - Averages are based on April 1 data for the period 1941-1990 (50 years, except for data sites established after 1941).

RUNOFF AND FORECASTS - Runoff data and runoff forecasts are shown as unimpaired values. Unimpaired runoff represents the natural water production of a river basin, unaltered by upstream diversions, storage, or by export or import of water to or from other watersheds. Forecast of runoff assumes median conditions subsequent to the date of forecast.

Runoff probability ranges are statistically derived from historical data. The 80 percent probability range is comprised of the 90 percent exceedence level value and the 10 percent exceedence level value. This means that actual runoff should fall within the stated limits eight times out of ten.

Runoff averages for most streams are based on the period 1941-1990. For more details contact California Cooperative Snow Surveys, P.O. Box 942836, Sacramento, CA 94236-0001, (916) 574-2635 or gridley@water.ca.gov.

INDICES OF WATER AVAILABILITY

The Sacramento River Hydrologic Region 40-30-30 Water Supply Index. The values 40-30-30 represent the percentage weight given to the three variables in the formula for the index. The first variable is the forecasted unimpaired runoff from April through July (40 Percent). The second variable is the forecasted unimpaired runoff from October through March (30 Percent). The third variable is the previous year's index with a cap to account for required flood control releases during wet years. The basins used in this computation are those used in the Sacramento River water year unimpaired runoff.

The Sacramento River water year unimpaired runoff is the sum of: Sacramento River above Bend Bridge, Feather River Inflow to Lake Oroville, Yuba River near Smartville and American River Inflow to Folsom Lake.

The San Joaquin River Hydrologic Region 60-20-20 Water Supply Index. In a similar manner, the values 60-20-20 represents the percentage weights on April through July runoff, October through March runoff and previous year's index. The San Joaquin River unimpaired runoff is the sum of: Stanislaus River Inflow to New Melones Lake, Tuolumne River Inflow to New Don Pedro Reservoir, Merced River Inflow to Lake McClure and San Joaquin River Inflow to Millerton Lake.

Runoff of the eight major rivers of the Sacramento and San Joaquin Regions is the sum of the runoff in the eight major rivers used in the two above indices.

State of California – The Resources Agency
DEPARTMENT OF WATER RESOURCES
P.O. Box 942836
Sacramento, CA 94236-0001

First Class

